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## TECHNICAL TRANSLATIONS

by

Dr. Andre L. Brichant

Chronological Abstract Listing of  
Scientific Literature

### ADDENDUM

Excerpts from "Transactions AGU", September 1969

## SCIENTIFIC TRANSLATIONS

by

Helmut E. Landsberg, President  
American Geophysical Union



THIRD QUARTER 1969

T E C H N I C A L   T R A N S L A T I O N S

by

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THIRD QUARTER 1969

ST-RA-INS-10851

5 pages  
[2 July 1969]

COMPOUND RADIOINTERFEROMETER WITH INDEPENDENT HETERODYNES FOR THE INVESTIGATION OF EMISSION SOURCES' RADIOIMAGES. [V.A. Alekseyev, Radiotekhnika i Elektronika, Tom 14, No.6, 1091-1093, Izd-vo "Nauka", 1969].

The present work develops further the methods, earlier proposed by R.C. Jennison and MacPhil [2,3], for the creation of a compound radiointerferometer with independent heterodynes, valid for the study of the angular structure of emission sources. The latter is indeed one of the fundamental problems of astrophysics.

AB-LPS-10852

5 pages  
[9 July 1969]

A B S T R A C T S:

[Astronomicheskii Vestnik, Tom 3, No.2, 1969]  
(199 pages)

ON THE REGULARITY IN THE DISPOSITION AND SIZES OF CRATERS IN CRATER-CHAINS ON THE MOON [M.M. Shemyakin, pp 65-75]

PARTICLES OF THE LUNAR ORIGIN

1. THE DETERMINATION OF ELEMENTS OF GEOCENTRIC ORBITS OF LUNAR PARTICLES IN THE SPATIAL CASE [V.P. Orlov, pp 76-81]

ONCE AGAIN ON THE RADIUS OF VENUS [D.Ya. Martynov, pp 82-84]

OPTICAL PROPERTIES AND THE STRUCTURE OF JUPIETER'S ATMOSPHERE.

II. THE INFLUENCE OF THE MULTIPLE SCATTERING IN A CLOUD LAYER ON PLANETARY ABSORPTION LINE PROFILES [V.G. Teifel, pp 85-95]

A STATISTICS AND ORIGIN OF METEOR FLARES [E.N. Kramer, A.K. Markina pp 96-105]

THE ESTIMATE OF THE EXPONENT IN THE LAW OF MASS DISTRIBUTION OF METEOR BODIES FOR LEONID STREAM 1967 [Yu.V. Bytsenko, et al

pp 106-107]

THE MORPHOLOGICAL INVESTIGATION OF NOCTILUCENT CLOUDS ON JULY 3-4, 1967 [I.N. Grishin, Yr., pp 108-113]

ON OBSERVATIONS OF VENUS DICHOTOMY [V.G. Lozitsky, pp 114-117]

JUPITER FROM OBSERVATIONS OF 1966-1967 [N. K. Andrianov, L.A. Vishnyakova, pp 117-119]

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The former postal address 1145- 19th St.NW remains valid.

AB-NP-10853

5 pages  
[14 July 1969]A B S T R A C T  
STUDY OF ENERGY GENERATORS

[Trans. from French, author &amp; source unknown]

I. GENERAL DEVELOPMENT:a)Theoretic Neutronics, b)Physics of the Exposed Fuels, c)Studies of Protection, d)Technology: 1)Welding and Machining from Distance, 2)Welding by Electron Bombardment in Manufacturing Heavy Boilers.II. NATURAL URANIUM-GRAPHITE-GAS DIE-STOCK

a)Study of Graphite Moderated Natural Uranium Lattices, b)Thermic Studies, c)Studies of Mechanics, d)Study of Graphite Jackets for the EDF Fuel.

AB-CR-IGA-10854

2 pages  
[14 July 1969]ON THE POSSIBILITY OF AGREEMENT OF MEASUREMENT ON AES "PROTON" WITH THE DATA ON SIDEREAL-DAILY VARIATION AND WITH DIFFERENT MODELS OF ORIGIN OF COSMIC RAYS. [L.I. Dorman, Kosmicheskkiye Issledovaniya, Tom 7, vyp.3, pp 402-414, Izd-vo "Nauka", 1969].

Different models are considered of metagalactic and galactic origin of cosmic rays from the standpoint of possibility of their agreement with the following cases:

1. Splitting of spectra of protons and nuclei in the region of particle rigidity  $> 10^{11} - 10^{12}$  v according to observation data on satellites of the "PROTON" series;

2. contemporary data on sidereal-daily variation of cosmic rays;

3. distortion of the energy spectrum and of the nuclear composition in interplanetary space.

It is shown that the following cases are difficult to conciliate with the aggregate of the indicated data: a) the different models of metagalactic origin; b) the nonstationary model of galactic origin; 3) the stationary model of galactic origin in the assumption that fragmentation takes place in the interstellar space.

Analysis shows that preference should be given to the stationary model of galactic origin with prevailing generation of heavy nuclei in the initial period of supernova shell formation and fragmentation at diffusion in the shell. The indicated data satisfy also the stationary model of cosmic ray origin as a result of periodic flares of a quasar at Galaxy center, on the condition of materialization of preferential generation of heavy nuclei, and that fragmentation takes place basically within a comparatively small neighborhood of the quasar (quasi-stellar object), say, in its shell.

ST-PA-OA-10855

7 pages  
[17 July 1969]ON LIGHT REFRACTION IN THE ATMOSPHERE OF VENUS. [M.M. Skotnikov, Kosmicheskkiye Issledovaniya, Tom 7, vyp.3, pp 436-440, Izd-vo "Nauka" 1969].

Calculation of light refraction is conducted on the basis of

data on direct investigations of Venus' atmosphere with the aid of Soviet AS "VENERA-4".

It is established that at an altitude of 8.3 km from the assumed surface, horizontal rays by-pass the planet over a circumference. Trajectories of light rays, originating from the assumed surface of the planet at various angles, are computed. It is shown that the rays returning to the surface are those emitted at angles to horizon not exceeding  $2^\circ$ .

ST-PHM-RAD-10856

6 pages  
[22 July 1969]

EFFECT OF ADVANCE EXPOSURE ON THE SENSITIVITY OF THE UV-2T FILM TO SHORTWAVE ULTRAVIOLET RADIATION. [M.R. Shpol'skiy & M.F. Razorenova, Kosmicheskiye Issledovaniya, Tom 7, vyp.3, pp 441-444, Izd-vo "Nauka", Moscow, 1969].

The influence is investigated of the background created by all sorts of radiations (electrons, gamma-quanta and light) on the sensitivity of the UV-2T film to shortwave UV-radiation.

An effect of sensitivity increase is noted in the case of preliminarily exposed photolayer to radiation with wavelength  $\lambda = 584 \text{ \AA}$ . The assumption is made about a mechanism of latent image formation in a photolayer subject to advance exposure.

ST-CM-LS-IM-10857

9 pages  
[6 August 1969]

PARTICLES OF LUNAR ORIGIN. I. DETERMINATION OF ELEMENTS OF GEOCENTRIC ORBITS OF LUNAR PARTICLES IN THE SPATIAL CASE. [V.P. Orlov, Astronomicheskiy Vestnik, Tom 3, No.2, str. 76-81, Izd-v "Nauka", 1969]

Elements are derived of geocentric orbits of particles ejected from the Moon by shock explosions of meteorites as a function of primary conditions of ejection: selenocentric longitude  $\lambda_0$  and latitude  $\phi_0$ , initial velocity  $V_0$ , azimuth  $A_0$  and the zenithal distance  $\delta_0$  of the direction of ejection.

It is shown that the lines of nodes of geocentric orbits of particles of lunar origin are concentrated near the position of the Moon at time of particle ejection.

The region of the lunar surface is determined, from which vertical motion of particles toward the Earth is possible.

ST-GC-LS-10857-A

8 pages  
[20 August 1969]

OPTIMUM LANDING OF A SPACECRAFT ON THE MOON [V.K. Isayev and B.Kh. Davidson, Kosmicheskiye Issledovaniya, Tom 7, vyp.3, pp 368-373, Izd-vo "Nauka", Moscow, 1969].

The optimum landing of a spacecraft at a fixed point on the surface of the Moon from a low circular AMS orbit is investigated.

Analyzed are the influence of thrust load, of the height of the initial orbit and of the range of the landing site on the magnitude of spacecraft's final mass. Examples are brought out of optimum trajectories and optimum control programs of thrust magnitude and direction.

ST-CM-LS-10858  
5 pages  
[20 August 1969]

OPTIMUM SPACECRAFT LIFT-OFF FROM THE MOON'S SURFACE. [V.K. Isayev and B.Kh. Davidson, Kosmicheskiye Issledovaniya, Tom 7, vyp.3, pp 374-376, Izd-vo "Nauka", Moscow, 1969].

The problem of optimum landing of a spacecraft from the AMS orbit on the Moon's surface is investigated in [1]. Presented here are the results of the analysis of problem's numerical solution and, in particular, the material for comparison of optimum programs with theoretical dependences [2], previously obtained by the authors.

The present work is dedicated to the investigation of motion dynamics over the subsequent stage of lunar expedition which is the spacecraft's lift-off from lunar surface into the circular AMS orbit. These two maneuvers have much in common from the standpoint of the application of optimization methods. Reference to work [1] was made in a series of cases, thus making a detailed expose unnecessary.

ST-AI-10859  
12 pages  
[25 August 1969]

RESULTS OF EXPERIMENTAL STUDIES OF IONOSPHERIC DRIFTS IN EASTERN SIBERIA. [E.S. Kazimirovskiy and V.D. Kokourov, PREPRINT, Siberian Division of the USSR Academy of Sciences, Irkutsk, 1968].

The results are communicated of the study of the horizontal drifts of ionization's small-scale inhomogeneities in the ionosphere by the method of spaced reception with small base, conducted in Irkutsk ( $52^{\circ}28'$  N.lat.,  $104^{\circ}02'$  W.long.) during the period from 1957 to 1967.

The results are discussed of measurements for the period of high solar activity alongside with the balance sheet of the special 1965-1966 program.

It is stressed that the basic drift regularities in the IQSY period do not vary substantially by comparison with those in the IGY period.

ST-MHD-SP-10860  
7 pages  
[25 August 1969]

SOLUTION OF ONE CLASS OF MAGNETOHYDRODYNAMIC EQUATIONS WITH MAGNETIC FIELD AMPLIFICATION. [A.V. Getling, Doklady A.N. SSSR. Fizika, Tom 187, NO.2, pp 301-304, Izd-vo "Nauka" 1969]

The object of this paper is to work out a kind of dynamo-theory

that could come close to model oscillating hydrodynamic dynamos of interest, among other applications, to solar physics.

To that effect, the author investigates to what magnetic configurations does the "hydromagnetic activity" of a convective cell lead if and when Coriolis forces are in action.

The author resolves the problem for the simplest model. Its interest resides in the fact that it may be easily extended from this simplest particular case to diversified situations with resembling velocity fields. These may in their turn be interesting, for applications, and this is why they are discussed in the present work.

ST-AM-RAD-10861  
9 pages  
[28 August 1969]

THE ROLE OF MINOR ATMOSPHERE ADMIXTURES  
IN THE ABSORPTION OF INFRARED RADIATION.  
[B.P. Kozyrev and V.A. Bazhenov, Fizika  
Atmosfery i Okeana, Tom 5, No.7, pp 738-  
744, Izd-vo "Nauka", Moscow, 1969].

The role of minor atmospheric gas admixtures in the absorption of infrared radiation is discussed from various points of view. The unavailability of practical methods of computations is emphasized. The transparency of minor atmospheric admixtures is plotted as a function of  $W/W_0$  and the errors of calculation are evaluated. It is concluded that minor atmospheric components play a significant role in the attenuation of infrared radiation.

ST-NP-AC-10862  
7 pages  
[27 August 1969]

CONSTANT OF STEP-BY-STEP IONIZATION OF  
ATOMS. [B.M. Smirnov, Doklady A.N. SSSR,  
Fizika, Tom 187, No.4, pp 787-790, Izd-vo  
"Nauka", 1969]

The object of this work is to establish the constant of step-by-step ionization in a large discharge tube by way of its dependence on temperature and density of electrons and properties of different atomic gases. The ratio of such constants is established for two such gases. The earlier calculations by Bates *et al* are proved to be incorrect.

ST-AI-MHD-10863  
6 pages  
[28 August 1969]

INTRA-ATMOSPHERIC MIGRATION AND DISSIPATION  
OF H AND He UNDER THE ACTION OF MAGNETOHYDRO-  
DYNAMIC WAVES. [V.I. Krasovskiy, Geomagne-  
tizm i Aeronomiya, Tom 9, No.4, pp 689-692,  
Izd-vo "Nauka", 1969].

The possibility of escape of light H and He atoms from the Earth's atmosphere under the action of magnetohydrodynamic oscillations at exosphere boundary is considered in this paper. In the latter, the oscillating ions do not practically interact with

neutral atoms. However, charge-exchange of ions with their escape into the near-Earth space or transfer into higher latitude at exosphere boundary is quite possible. With deeper penetration into the atmosphere the recharged ions can no longer dissipate or migrate from the place of charge-exchange, inasmuch as their energy will be lost over the path to the exosphere boundary.

ST-PA-EMWP-10864

9 pages  
[31 August 1969]

INFLUENCE OF A PLANETARY ATMOSPHERE  
UPON THE FRESNEL DIFFRACTION OF ULTRA-  
SHORT WAVES. [V.A. Andrianov, Radio-  
tekhnika i Elektronika, Tom 14, No.8,  
pp 1355-1361, Izd-vo "Nauka", 1969].

The asymptotic representation is obtained of the attenuation function in the region of Fresnel's penumbra at ultrashort wave diffraction around a planet surrounded by atmosphere.

The results are presented of numerical calculations for an exponential profile of the atmosphere.

ST-PR-LS-10865

6 pages  
[1 Septem.1969]

AUTOMATIC STATION "ZOND-7" PHOTOGRAPHS  
THE MOON AND THE EARTH. [Tass Release  
and Photographs selected from the three  
newspapers "Pravda", "Komsomol'skaya  
Pravda" and the weekly "Nedelya", Moscow  
22 August, 1969]

N.B. The best of all photographs published have selected for this reproduction. The photos are the same, only the scale differs.

As already communicated, one of the scientific experiments conducted in the course of the flight of AIS "ZOND-7" was color photographing of the Earth and the Moon.

ABS-NP-10866

8 pages  
[10 Sept. 1969]

ABSTRACTS FROM: JOURNAL OF NUCLEAR PHY-  
SICS (YADERNAYA FIZIKA) [Volume 10, 1969  
pp 3-198, Izd-vo "Nauka", Prepared by  
Dr. Andre L. Brichant].

N.B. The release of these abstracts is purely tentative, being probably of marginal interest to space scientist, except for those specializing in nuclear physics. Continuation of these releases will proceed only if sufficient interest on the part of NASA scientists warrants it.

ST-AI-AM-10867

33 pages  
[8 Sept.1969]

THE WIND SYSTEMS IN THE LOWER IONOSPHERE  
[E.S. Kazimirovskiy, Siberian Division of  
I.Z.M.I.R.A.N. From Author's Preprint,  
Ionosfernyye Issledovaniya IGY Series, No.  
14, pp 48-70 Izd-vo "Nauka" Moscow 1965]

This paper constitutes a short review of theoretical and semi-empirical patterns of the general circulation at ionospheric altitudes, and of unified results of measurement data reduction of ionization inhomogeneities' horizontal drift in the ionosphere conducted during the IGY-IQSY period by the world network.

The author analyzes the data obtained for the D- E- and E<sub>s</sub>-regions of the ionosphere by the method of spaced reception with small base and by radar observations of meteor trails. An attempt is made to evaluate the system of general circulation in the lower ionosphere according to material from 29 stations. Maps of global distribution of the most probable directions of motion are also presented.

The paper shows that the character of diurnal variation of the drift rate depends on the latitude of the place of observations and, to a lesser extent, on season. Comparison of the results of these variations' harmonic analysis shows the existence of one system of regular motions in the lower ionosphere. The author gives the schemes of parameters' global distribution for the continuous, diurnal and semi-diurnal components of zonal and meridional variations of wind velocity components. He shows that these parameters vary with latitude and depend on the season. A confirmation has been obtained of the hypothesis that the ionization irregularities in the E-region and the ionized meteor trails in winter are formed at different altitudes. Comparison is made of wind systems obtained as a result of measurement analysis with theoretical systems, and the causes of their incomplete coincidence are discussed.

ST-ES-GM-10868

8 pages

[16 Sept. 1969]

CAUSES OF MOTION OF GEOGRAPHIC POLES

AND NATURE OF WORLD GEOPHYSICAL FIELDS.

[A.V. Dolitskiy, Doklady Akademii Nauk SSSR, Tom 1 7, No.3, pp 32-635, Izd-vo "Nauka", 1969]

This paper discusses the causes of motion of geographic poles invoking various data concerning the planes along which the displacements of the interface "core-mantle" take place. The relative shifts of separate parts of the Earth's crust layer are examined in the light of the "Guttenberg" waveguide theory. The trajectories of motion of the North geographic and magnetic poles are shown in a chart in the form of spiral-shaped curves. Describing some of the singularities of the Earth's magnetic field, the author found a way to reconstruct it through various geological epochs. Finally, the motions of the Earth's crust and the shape of the geoid are defined, invoking the Pavoni chart.

ST-PF-GM-10869

10 pages

[22 Sept. 1969]

INVESTIGATIONS OF THE SPECTRUM OF PROTONS  
IN THE INNER RADIATION BELT WITH THE AID  
OF AES "KOSMOS-137. [I.A. Savenko, O.I.



Savun, & P.I. Shavrin, Kosmicheskiye.  
Issledovaniya, Tom 7, vyp. 4, pp 553-558  
Izd-v "Nauka", 1969]

The results of investigations are communicated of the spectrum of protons in the inner radiation belt with the aid of AES "KOSMOS-137" on shells with  $L = 1.2 - 1.7$ , alongside with the spatial distribution of protons in the energy range  $0.8 - 1000$  Mev and in the plane of the geomagnetic equator.

Comparison is made of the results obtained with those of other authors.

ST-IM-10870

ON ANTIMATTER PENETRATION INTO THE SOLAR SYSTEM  
AND THE EARTH'S ATMOSPHERE. [V. A. Bronshteyn &  
K. P. Stanyukovich, Kosmicheskiye Issledovaniya  
Tom 7, vyp.4, pp. 597-601, "NAUKA", 1969.

The motion of hypothetical bodies of the Solar system and in the Earth's atmosphere is investigated. It is established that, at collisions of antibodies with interplanetary gas and atmosphere atoms, not only annihilation, but also intensive evaporation take place, its specific energy being by 10 orders less than the specific energy of annihilation. As a result, at  $1 \text{ atom/cm}^3$  density of interplanetary gas, an antibody of radius  $r_0 \ll 1 \text{ cm}$ , cannot cross the Solar system even once. At its entry into the terrestrial atmosphere a sharp antibody deceleration takes place at the expense of the reactive pulsed radiation occurring at annihilation, as well as its evaporation; the latter will be completed for bodies of meteor dimension at altitudes of  $450-800 \text{ km}$ , and for  $r_0 = 1 \text{ m}$  at  $200 \text{ km}$  altitude. Thus, the possibility of antimatter nature of meteors and comets, postulated in the work [1], is excluded.

ST- PA-10871

ESTIMATES OF BOUNDARY LAYER PARAMETERS IN PLANETARY  
ATMOSPHERES OF THE TERRESTRIAL GROUP. [G. S. Golitsyn]  
Izv. AN SSSR, Fizika Atmosfery i Okeana, Tom 5, No. 8  
pp. 775-781, Izd-vo "NAUKA", 1969.

The similarity theory of atmosphere boundary layer is applied to the estimate of the form of vertical profiles of average wind velocity and potential temperature in the atmospheres of planets of the terrestrial group in day and nighttime conditions.

It is then considered, as also for the Earth, that the magnitude of the turbulent heat flow  $q_T$  in daytime is about  $0.1$  of  $q(1 - A)$ , where  $q$  is the solar constant for the planet,  $A$  is its albedo, and, in nighttime  $q_T$  is still less by several factors. The dynamic velocity  $U^*$  is taken equal to  $2 - 5$  percent of the mean wind velocity in the free atmosphere (depending upon the stratification), which was adopted after the computations of work [5].

The boundary layers in the atmospheres of Mars and Venus, and in the hypothetical atmosphere of Mercury are examined in detail. Sharp temperature drops are characteristic of Mars within the bounds of a few tens of meters, attaining several tens of degrees, which is caused by the low density of its atmosphere.

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Owing to its very high atmosphere density, for Venus the stratification is also close to neutral, that is, the temperature profile is nearly adiabatic.

Due to high winds, the stratification of Mercury must also be close to neutral with respect to the wind (the profile being close to logarithmic), but, because of low density, such temperature drops may be very great.

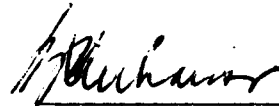
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N.B. This is the last of the series of translations and abstracts issued under Contract No.NAS-5-12487, which expired on 30 September 1969.

Any further work undertaken by the undersigned on behalf of VOLT INF. SCI. Inc. will be done under purchase order basis.



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# Scientific Translations

## THE PRESIDENT'S PAGE

One of the unfortunate victims of nineteenth century nationalism was the common language for scientific publication. Up to that time Latin had continued as a *lingua franca* among scientists. But the competition of local academies, sponsored by princes jealous of each other, led eventually to the use of the vernacular for scientific communication.

Yet in the interval up to World War I it developed that most scientific work was concentrated in a few major nations and publications were over 90 per cent in English, French, and German. The universal language of diplomacy was French and it was adopted by some of the important scientific bodies in countries with other, particularly, slavic tongues as the medium for their scientific communications. Most notable among these was the Imperial Russian Academy of Sciences in what was then St. Petersburg.

The leading scientific journals were also published in these three languages and scientific authors who had the desire to be read published their work in one of the three languages. Graduate schools soon adapted to this new equilibrium state by requiring that their Ph. D. candidates learn these languages. International scientific congresses managed their sessions in these languages.

The fierce nationalism that followed World War I, with the formation of many new countries and the break-up of colonial empires, increased the number of languages in scientific publications. The use of the tongue of former rulers became anathema. The local language took precedence. The greatest change came in Russia. Not only did French vanish from the scene (it had too much of the tinge of the *ancien regime*), but a tremendous upswing of scientific endeavor also started in the Soviet Union. To its detriment, the rest of the world ignored this upswing. The number of western scientists who mastered the unfamiliar Russian language was small. In addition, many were a bit conceited about the quality of the work of their eastern colleagues. Colleges introduced Russian language courses only slowly.

Then came the awakening to the new facts: First the Russian fission and fusion bombs, and then Sputnik. These technological feats made it clear that some first-class scientific work backed them up. The western scientific world finally realized that it had to pay closer attention to material published in Russian. It was far too late and tedious to expect wholesale learning of a new language among the scientists, even though Russian became an acceptable language option

for the incipient Ph.D.

The solution adopted was a massive translation effort, most of it into English. In the U.S. the National Science Foundation spearheaded the effort. Part of the translation was accomplished by the use of counterpart funds in foreign lands where scientists with the pertinent language skills resided. A major part was accomplished through contracts with scientific societies that arranged for translation and publication of Russian journals of interest to their members and profession. For many years AGU has participated in this effort. We now publish eight translated journals. Most important are the two geophysical issues of the *Akademiya Nauk*. Subscriptions to these issues have gradually increased, yet our whole translation effort is subsidized. Annual contracts of the NSF augment the income derived from subscription. This work is done by the Union on a no-loss, no-gain basis. We consider it a most important service to our members and the scientific community at large.

The Foundation has now reminded us that it considers its subsidy as a temporary measure that will have to be phased out, to use favorite Washington jargon, over a period of three years. In my own view, and considering the history recited above, this is an unfortunate policy. NSF would just re-institute the ignorance of the pre-Sputnik days. But these personal views aside, the Union had better prepare for the finality of the decision. It is certainly improbable that Latin will again become a universal language, nor is it very likely that proficiency in Russian will markedly increase. It is therefore imperative that we increase the number of subscriptions to the Russian translations so that they can become self-supporting. Failing this we will have to decide which journals should eventually be dropped from the program.

Several things are important at this juncture. The first is the evaluation of the necessity for the translation program by our members. We hope to have your views on that for consideration of the Russian Translation Board. The second is that those of our members who are not already familiar with these translations take the initiative to learn about them. Sample numbers can be obtained from the AGU office. The most positive step would be to urge librarians at the institutions where members work to subscribe. More than any other single action, increases in the subscription lists would most likely convince NSF that these translations are a necessity rather than a luxury for the geophysical sciences.

Helmut E. Landsberg  
President, AGU.